

C l a i m s

1.

A method for manufacturing a long-term storage container for storage of radioactive material to inhibit radioactive radiation therefrom to the outside of the container, said container having a bottom and upright wall extending therefrom, the top of said container to be closed off by a screw-on lid, said container having an integral inner container part of a first material with a bottom and upright wall, an integral outer container part of a second material with a bottom and upright wall, and radioactive radiation inhibiting material in an inter-space between the walls and bottoms of said inner and outer container parts; the method comprising:

- integrally casting in a first mould through injection moulding a first container part having a bottom and a wall,
- removing the first container part from the first mould;
- integrally casting in a second and separately located mould through injection or pressure moulding an inter-space container part of said radioactive radiation inhibiting material, said inter-space container part having a bottom and a wall and forming a second container part,
- removing said inter-space container part from the second mould,
- placing the first container part in a third mould ,
- placing said inter-space container in fitting engagement with exterior face of the first container part to form a first assembly of container parts,
- in the third mould locating the first assembly of container parts to cause said inter-space container part to be in spaced relationship to a mould member of the third mould, so as to form a cavity between the mould member of the third mould and the outside of the inter-space container part, the inside of the first container part being fitted onto a core member of the third mould,
- through injection moulding into said cavity integrally casting the outer container part forming a third container part having a side wall and a bottom, said third container part engaging the exterior faces of the inter-space container part, and
- removing from the third mould a second assembly of container parts formed by the first, second and third container parts to provide said storage container.

2.

A method according to claim 1, wherein a further first container part is cast simultaneously with the casting of the third container part.

5 3.

A method for manufacturing a long-term storage container for storage of radioactive material to inhibit radioactive radiation therefrom, said container having a bottom and upright wall extending therefrom to the outside of the container, the top of said container to be closed off by a screw-on lid, said container having an integral inner 10 container part of a first material with a bottom and upright wall, an integral outer container part of a second material with a bottom and upright wall, and radioactive radiation inhibiting material in an inter-space between the walls and bottoms of said inner and outer container parts; the method comprising:

- integrally casting in a first mould through injection moulding a first container part having a bottom and a wall,
- integrally casting in a second and separately located mould through injection or pressure moulding an inter-space container part of said radioactive radiation inhibiting material, said inter-space container part having a bottom and a wall and forming a second container part, and removing said inter-space container part from the second 20 mould,
- separating the first container part from a first part of the first mould which formed exterior side wall and bottom faces of the first integral container part,
- placing said inter-space container in fitting engagement with said exterior faces of the first container part to form a first assembly of container parts, the first container part being in engagement with a portion of a second part of the first mould;
- locating in a third mould the first assembly of container parts and causing said inter-space container part to be in spaced relationship to a mould member of the third mould, so as to form a cavity between the mould member of the third mould and the outside of the inter-space container part, the second part of the first mould having a portion inside the first container part to support it during moulding in the third mould, and a top of the second part of the first mould configured to be used to close off an open 30 end of said mould member of the third mould,
- through injection moulding into said cavity integrally casting a third container part having a side wall and a bottom, and

- removing from the third mould a second assembly of container parts formed by the first, second and third container parts to provide said storage container.

4.

5. A method according to claim 1, 2 or 3, wherein said first and second materials are selected from the group of: plastic materials, e.g. high density polyethylene; concrete; and ceramic materials.

5.

10 A method according to claim 1 or 3, wherein said inter-space container part forming the second container part is moulded from a radioactive radiation inhibiting material which is selectable from one of: lead, lead alloy, tin and tin alloy.

6.

15 A method according to claim 1 or 3, wherein the casting of the third container part in addition provides for threads on the outside of said outer container part, said threads dimensioned to enable fitting engagement with threads on a lid to be fitted by screwing onto the storage container.

20 7. A method according to claim 6, wherein the provision of threads on the outer container part also includes provision of locking means configured for non-releasable engagement with a locking member on said lid when said lid is fully screwed onto the storage container.

25

8. A method for manufacturing a radioactive radiation inhibiting lid suitable for fitting onto a top region of a storage container for long term storage of radioactive material and inhibiting radioactive radiation therefrom to the outside of the lid, the method

30 comprising:

- a) casting in a first mould through injection moulding of a first material an integral first lid member with a top part and a skirt depending therefrom, said casting

providing on an inside of said skirt threads to enable fitting engagement with external threads on said storage container, and said casting further providing in said top part at least one recess,

- b) releasing from the first mould said first lid member,
- 5 c) filling in liquid form a radioactive radiation inhibiting material in an inside region of said first lid member and said at least one recess, and
- d) allowing said radioactive radiation inhibiting material to solidify to form a second lid member, material retained in said at least one recess for non-releasable locking the second lid member to the first lid member.

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9.

A method for manufacturing a radioactive radiation inhibiting lid suitable for fitting onto a top region of a storage container for long term storage of radioactive material and inhibiting radioactive radiation therefrom to the outside of the lid, the method

15 comprising:

- providing a pre-cast second lid member made from radioactive radiation inhibiting material, suitably selected from lead, lead alloy, tin and tin alloy,
- placing the second lid member in a mould for moulding around at least one face and the edges thereof a first and integral lid member through injection moulding of a
- 20 first material, said integral first lid member provided with a top part and a skirt depending therefrom, said casting providing on an inside of said skirt threads to enable fitting engagement with external threads on said storage container, said second lid member further providing in said top part at least one recess in which said second lid member is located, and
- 25 - removing from the first mould said first lid member with the second lid member in non-releasable engagement the first lid member.

10.

- 30 A method according to claim 8 or 9, wherein said first mould is configured to provide at a lower end of the skirt a lifting or engagement face suitable to cooperate with a

container lifting device when such device is made to engage a container having a fitted lid.

11.

5 A method according to claim 8 or 9, wherein said step of casting said threads includes providing a locking member for non-releasable engagement with locking means on the outside of the storage container when the lid is fully screwed onto the storage container.

12.

10 A method according to claim 8 or 9, wherein said first material is a plastic material, e.g. high density polyethylene.

13.

15 A method according to anyone of claims 8 - 12, wherein said radioactive radiation inhibiting material is selected from lead, lead alloy, tin and tin alloy.

14.

20 A storage container for long-time storage of radioactive material and to inhibit radioactive radiation therefrom to the outside of the container, said container having a bottom and upright wall extending therefrom, the top of said container to be closable by a radioactive radiation inhibiting screw-on lid, said storage container comprising:

- an integral inner container part of a first material with a bottom and upright wall,
- an integral outer container part of a second material with a bottom and upright wall, and
- a radioactive radiation inhibiting material in an inter-space between the walls and bottoms of said inner and outer storage container part, respectively,

wherein said radioactive radiation inhibiting material is in the form of an injection or pressure moulded, integral inter-space container having a bottom and an upright wall extending therefrom, and

30 wherein said outer container part is a storage container part moulded onto the outside of the inter-space container part when the inter-space container part is fitted onto the outside of the inner container part.

15.

A storage container according to claim 14, wherein the storage container part on an outside face of the outer container part has threads configured to engage threads on said lid, and wherein the outer container part has locking means for non-releasable locking engagement with a locking member on said lid when said lid is fully screwed onto the storage container.

16.

10 A lid for use with a storage container according to claim 14 or 15, wherein said lid has an injection moulded, integral first lid member of a first material with a top part and a skirt depending therefrom, an inside of said skirt having threads to enable fitting engagement with external threads on said storage container, and at least one recess in said top part, at least one recess, and
15 wherein a second lid member is provided in the form of a solidified radioactive radiation inhibiting material located in an inside region of said first lid member and said at least one recess, said material retained in said at least one recess for non-releasable locking the second lid member to the first lid member.

20 17.

A lid according to claim 16, wherein said lid has a portion of said skirt configured to be able to engage a container lifting device.

18.

25 A lid according to claim 16, wherein said first lid member of said lid is made of a plastic material being the same as that of the inner and outer container parts.

19.

A storage container according to claim 14, wherein said radioactive radiation inhibiting material is one of: lead, lead alloy, tin and tin alloy.

20.

A lid according to claim 16, wherein said radioactive radiation inhibiting material is one of : lead, lead alloy, tin and tin alloy.

5 21.

A storage container according to claim 14, wherein said first and second materials are elected from the group of: plastic material, e.g. high density polyethylene; concrete; and ceramic materials.

10 22.

A lid according to claim 16, wherein said first material is high density polyethylene.

23.

A moulding apparatus for casting inner and outer container parts of a long-term storage container for storage of radioactive material to inhibit radioactive radiation therefrom to the outside of the container, the storage container to be provided with a radioactive radiation inhibiting material in an inter-space between said inner and outer container parts, wherein said apparatus comprises two separate mould:
a primary mould for casting the inner container part, and
20 a secondary mould for casting the outer container part, said secondary mould having a member for supporting the inner container part with a separately provided inter-space container part fitted thereon when casting the outer container part to engage the outside face of the inter-space container part.

25 24.

A moulding apparatus according to claim 23, wherein the apparatus is provided with means for operating both the primary mould and the secondary mould simultaneously.